

STANDARD OPERATING PROCEDURE

Grinding Procedure for Sediment or Soil Samples

KEY WORDS

Sediment, fume hood, mortar and pestle, sieve

APPROVALS

APPROVED BY: Original Signed By DATE: 4/15/2009

Kean S. Goh
Environmental Monitoring Branch Management

APPROVED BY: Original Signed By DATE: 4/15/2009

Sheryl Gill
Environmental Monitoring Branch Senior Scientist

APPROVED BY: Original Signed By DATE: 4/15/2009

Chang-Sook Lee Peoples
Environmental Monitoring Branch Quality Assurance Officer

PREPARED BY: Original Signed By DATE: 4/15/2009

Sarah Lyon
Scientific Aide

Environmental Monitoring Branch organization and personnel, such as management, senior scientist, quality assurance officer, project leader, etc., are defined and discussed in [SOP ADMN002.01](#).

STANDARD OPERATING PROCEDURE

Grinding Procedure for Sediment or Soil Samples

1.0 INTRODUCTION

This procedure can be used for grinding soil or sediment for various procedures used by the Department of Pesticide Regulation, such as analyzing soil particle size ([METH004.00](#)) or total organic carbon ([METH005.00](#)) samples.

1.1 Purpose

The purpose of this SOP is to provide technical and safety guidance for grinding sediment samples for further analysis

2.0 MATERIALS

- 2.1** U.S.A Standard Testing Sieve, # 10, Opening 2 mm
- 2.2** U.S.A Standard Testing Sieve, #18, Opening 1 mm
- 2.3** U.S.A Standard Testing Sieve, #35, Opening 0.5 mm
- 2.4** Pan for catching sifted sediment
- 2.5** Latex gloves
- 2.6** Sediment sample
- 2.7** Fume hood
- 2.8** Spatula
- 2.9** Plastic-backed, lab table soakers
- 2.10** Mortar and pestle
- 2.11** Lid

STANDARD OPERATING PROCEDURE

Grinding Procedure for Sediment or Soil Samples



Figure 1. Sieves, spatula, mortar and pestle

3.0 PROCEDURES

3.1 Preparing the Sediment Sample

- 3.1.1 If your sediment sample is frozen, remove it from the freezer. Thaw overnight at room temperature.
- 3.1.2 Wear gloves while handling the sediment samples. Remove the lids from the sediment containers and bake in an oven 103 – 105°C for 18 – 24 hours. As the samples bake, periodically stir the samples with a clean spatula to prevent caking. This will facilitate the grinding process.

STANDARD OPERATING PROCEDURE

Grinding Procedure for Sediment or Soil Samples

3.2 Grinding the Sediment Samples

- 3.2.1 Grind the sediment samples in the fume hood to reduce inhalation of sediment dust.



Figure 2. Fume hood with sieves and other materials

STANDARD OPERATING PROCEDURE

Grinding Procedure for Sediment or Soil Samples

-
- 3.2.2 To prepare the work area, cover the bench in the fume hood with lab table soakers. This will minimize the cleaning of the fume hood and keep the sediment contained.
- 3.2.3 Before beginning the grinding procedure, ensure that both of the switches for the fume hood fan are turned to the on position. Switches are located on the wall to the right of the fume hood. Fume hood should have a safe flow as determined by the attached hood alarm
- 3.2.4 Begin the grinding process by breaking up the sample with the spatula. Place a small amount of the sediment into the mortar. Grind the sediment with the pestle until it can't be ground any further.
- 3.2.5 Select the appropriate sieve depending on the sediment size desired for the type of analysis to be performed on the sediment. The project leader will use table 1 to select the sieve.

Name	Size (mm)
Very coarse sand:	2.0-1.0 mm
Coarse sand:	1.0-0.5 mm
Medium sand:	0.5-0.25 mm
Fine sand:	0.25-0.10 mm
Very fine sand:	0.10-0.05 mm
Silt:	0.05-0.002 mm
Clay:	< 0.002 mm

Table 1. USDA soil particle size classes <2 mm mineral material

STANDARD OPERATING PROCEDURE

Grinding Procedure for Sediment or Soil Samples

- 3.2.6 Set sieve atop the pan used to collect the sediment, then place the lid on the sieve to prevent sediment from escaping and creating dust. Shake the sieve to sift the sediment through the screen.
- 3.2.7 Repeat until the entire sample has been ground and sifted. Throw away debris such as leaves, twigs, and gravel if not needed in subsequent analyses. When the entire sample has been ground and sifted, pour the sifted sediment back into the original jar and seal with the original lid. The sample is ready for use.
- 3.2.8 In between grinding different sediment samples, wipe of the mortar and pestle with a damp cloth. Dry before using.
- 3.2.9 When the grinding has been completed for the day, turn off the fume hood fan, wash the equipment with soap and water, and wash the fume hood.

REFERENCES

USDA Soil Particle Size – Natural resources Conservation Service. 2008.
Available at
<http://soils.usda.gov/technical/manual/contents/chapter3e.html>